

Running Head: Cardiovascular Risk Reduction

U. S. Army-Baylor University

Graduate Program in Healthcare Administration

Case Study of Cardiovascular Risk Reduction in the
Northwest Region and TRICARE Region 11

A Graduate Management Project Submitted to the
Faculty for Candidacy for the Degree of Master's in
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ABSTRACT

The outcomes management team at Madigan Army Medical Center was tasked by the Commanding General to develop and implement a cardiovascular risk reduction program for the Western Region Medical Command and TRICARE Lead Agent Region 11. The outcomes management team developed a cardiovascular risk reduction scorecard and metrics in which to evaluate the care being given to the TRICARE prime enrollees with a cardiovascular disease diagnosis. The program developed metrics to evaluate and monitor the compliance of standards of care for these patients. It was determined that each of the metrics, the region needs to improve the care being provided; however, some metrics have greater progress to achieve the outcome goals. The overall goal of the program is to decrease the beneficiaries' risk or risks for cardiovascular disease, thereby decreasing the amount of costly treatment to the medical treatment facility, and improving the overall quality of life for the beneficiaries.

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Introduction

Overview of the Western Regional Medical Command and TRICARE Region 11

The headquarters, Western Regional Medical Command (WRMC) and the headquarters for TRICARE Region 11, are co-located at Fort Lewis Washington. The total population eligible for care within these two regions is 389,975 (TRICARE, 2002). The WRMC is a regional headquarters of the U.S. Army Medical Command (MEDCOM), and is commanded by a brigadier general. This officer also serves as the lead agent, the senior leader responsible for integrating healthcare delivery within TRICARE Region 11, and brings a new approach to providing healthcare to these two northwest military regions.

The geographic area of the WRMC includes Yuma Proving Grounds (on the western border of Arizona) California, Idaho, Nevada, Washington, Alaska. TRICARE Region 11's geographic area includes Washington, Oregon, Alaska and six counties in western Idaho. The WRMC is made up of three inpatient medical treatment facilities (MTFs) and many smaller clinics. One of the MTFs Madigan Army Medical Center (MAMC), is a tertiary care medical center (MEDCEN) that supports graduate medical education for 16 residency programs. MAMC is located on Fort Lewis Washington, which has become the home of the Army's transformation efforts. The other two MTFs within WRMC are small community hospitals

located at Fort Wainwright, Alaska, and Fort Irwin, California. These two MTFs utilize MAMC as their referral center for more complex care.

TRICARE Region 11 MTFs include MAMC and the Fort Wainwright Community Hospital, plus Air Force, Navy, and Coast Guard MTFs and clinics. The Air Force has a hospital and a small clinic in Alaska. It also has a primary care clinic at McChord Air Force Base, which borders Fort Lewis, and at Fairchild Air Force Base which borders eastern Washington and the western Idaho border. The Navy has two medical facilities in Washington: Navy Hospital Bremerton, which trains physicians, and Oak Harbor. Both facilities are located in the Puget Sound.

Conditions that Prompted the Study

Cardiovascular diseases and the many deaths attributed to them have long been a global concern. Throughout different countries, variation occurs regarding the rate and severity of the cardiovascular disease process (American Heart Association, 2002). In the early 1990s, the most common cause of death in the United States was heart disease, and the third most common was cerebrovascular disease (McGinnis & Foege, 1993). The direct and indirect economic costs of cardiovascular disease in the U. S. in calendar year 2002 exceeded \$329 billion. Direct costs were consisted of the cost of hospitals, nursing homes, provider services, medications, durable medical equipment, and

home health care. Indirect costs incorporated the lost productivity for the individual(s) involved and for family member(s) who care for them (American Heart Association, 2002). Military beneficiaries are a subset of the total U.S. population and have similar rates of morbidity and mortality attributed to all cardiovascular diseases as compared to the U.S. population.

Currently, the U.S. military is experiencing a very high operational tempo as military personnel deploy worldwide or support such deployments to various parts of the world more often and for longer periods of time. The military health system (MHS), in particular, the Army Medical Department (AMEDD), must address the reasons and issues that impact the health of the military. Manpower is the key aspect of the military and without a healthy fighting force; the U.S. cannot be protected. General Eric K. Shinseki, the former Army Chief of Staff, said, "People are really the centerpiece of army transformation" (BG Michael Dunn, Outcomes Management Briefing, November 2002)." Military Health System is critical to the manning and readiness of the forces and the commanding general of the WRMC is establishing healthcare programs that support army transformation.

The MHS must have an effective program for screening and identifying military beneficiaries who are at risk for, or have cardiovascular disease. Once individuals are identified as at

risk for cardiovascular disease they can receive further testing and then treatment with the goal of avoiding a cardiovascular disease episode. If the program is effective it will save the military lost man-hours and will also serve to reduce the MHS costs associated with the treatment of cardiovascular diseases.

The Commanding General of MAMC is implementing an outcomes management program dedicated to cardiovascular risk reduction within the WRMC and TRICARE Region 11 medical facilities; he is placing a strong emphasis on the troop population at Fort Lewis as one subgroup of outcomes management. Over a two year period, two Fort Lewis Soldiers died of acute myocardial infarction sustained during physical fitness training. Their deaths served as a catalyst for establishing the cardiovascular disease reduction program a command priority.

Statement of the Problem

Resources are scarce throughout the MHS, which necessitates the need for MTS to be more financially responsible when delivering health care. If outcomes management is to become the tool used to demonstrate personnel and financial benefits to lawmakers in order to change the way the lawmakers evaluate the efficacy of military medicine, information must be collected and analyzed. Establishing a cardiovascular risk reduction program, identifying the initial cohort of individuals to enroll in the program, and then implementing the program throughout their

respective regions are three major issues facing WRMC & Tricare Region 11.

Purpose of the Study

The purpose of this study was to design and implement a cardiovascular risk reduction program that identified and decreased cardiovascular risk for the beneficiary population before it required high risk, expensive medical care. This study was designed to develop a reliable assessment tool for screening and identifying individuals at increased risk for cardiovascular disease. The metrics screened the cohort for all of the cardiovascular risk indicators identified for monitoring. Once the tool was developed, screening the beneficiary population will begin as well as the education of the providers who treat these patients. The beneficiaries identified as having an increased risk for cardiovascular disease will be offered appropriate medical treatment and education within the MTFs. Once the program was developed, the plan is to continue to gather and analyze data for the metrics quarterly for improvement or changes in each area. The goal is to demonstrate improvement each quarter until all areas measured in the metrics are demonstrating that these patients are decreasing their risk for cardiovascular disease to the maximum extent possible.

Literature Review

The principal objective in any outcomes management program is to improve the health status of one's beneficiaries. The outcomes management program at MAMC has begun the process of improved health status for those with cardiovascular disease risk factors. Prior to identifying individuals at increased risk for a disease process, the risk factors must be identified. The leader in compiling statistics and risk factors on cardiovascular disease is the American Heart Association (2002).

According to current estimates by the American Heart Association (2002) over 61 million Americans (or, one in five,) have one or more types of cardiovascular disease. There are five defined subcategories of cardiovascular disease by the American Heart Association. High blood pressure (hypertension) is defined as a systolic pressure of 140 millimeters or higher of mercury, or a diastolic pressure of 90 millimeters or higher of mercury. An individual is also classified as hypertension if he/she who has a blood pressure within an acceptable range of 140/90 while taking prescribed anti-hypertensive medications. Fifty million Americans over the age of five have high blood pressure, and, almost 32% are unaware they have high blood pressure (American Heart Association, 2002).

Coronary heart disease includes acute myocardial infarction (AMI) and angina pectoris. Coronary heart disease

was the cause for over half a million deaths in 1999 in the U.S. As cited in the Framingham Heart Study (2002), over one half of the individuals who died suddenly of coronary heart disease had no previous signs or symptoms of the disease process. AMI is the death of some cells of the heart. It results from a lack of oxygenated blood usually caused by a blocked artery getting to an area of the heart. Angina pectoris is pain or discomfort in the chest due to an inadequate flow of blood to the heart muscle. Angina pectoris differs from AMI in the absence of cell death. However, some individuals with angina will go on to develop an acute myocardial infarction even with treatment (American Heart Association, 2002).

Stroke is the third subcategory of cardiovascular disease. In 1999, strokes killed more than 160,000 individuals, nationwide. Strokes occur from a blockage of blood flow to a certain area in the brain. All areas of the brain are susceptible to a stroke. A stroke can happen by having blood flow blocked for a number of various reasons such as blood clots or a ruptured blood vessel (American Heart Association, 2002).

The fourth subcategory of cardiovascular disease is congestive heart failure (CHF). Almost a half million Americans are currently diagnosed with congestive heart failure, which is the inability of the heart to pump blood effectively. Depending on the side of the heart that is failing, the individual will

have blood and fluid backing up into the lungs or in the veins of the lower extremities. Congestive heart failure does not have the immediate morbidity of some of the other diseases. However, these patients live with this disease for years, usually have more frequent visits to their providers and a higher incident of admissions to the hospital (American Heart Association, 2002).

The final category of cardiovascular disease is congenital cardiovascular defects. There are at least 35 different types of documented defects in more than 40,000 babies born each year. The morbidity and mortality associated with congenital cardiovascular defects has been declining over the past few decades due to medical advances. However, the morbidity and mortality varies with all types of defects (American Heart Association, 2002).

Calculating an individual's risk factors for cardiovascular disease process can identify individuals who are at risk. Barton (1999) describes the four determinants of health and their relationships to illness: personal traits, which include age, gender, genetics and ethnic background; physical environment, which includes geography, climate, food, water and housing; social or behavioral environment, which includes education, occupation and personal behaviors; and, access to health services.

The risk factors are divided into two subcategories, factors that the individual can influence or change and that the individual cannot. It is vital to gather information about all of the risk factors for the individual prior to determining the individuals' overall risk(s) for the disease. If an individual has many personal trait risk factors that cannot be changed, then the goal of the health education must be to mitigate those risk factors and provide follow ups by health care providers. Even individuals with low levels of risk factor over many years have an increased risk of cardiovascular disease (Pearson et al., 2002).

Risk Factors-Not Changeable

The first risk factor that cannot be changed is gender. Men have a greater risk than women of developing cardiovascular disease than women until women reach the age of 50. However, after the age of approximately 50 the risk of developing the disease evens out between the genders (Collins, Stevenson, & Mosca, 2002). Kannel (2002) states that women lag behind men by approximately 10 years for the incidence of cardiovascular disease until the age of 55. In a calculation of cardiovascular risk score completed in a study by Engler, Christensen, Karlsmore, Lous and Lauritzen (2002), the males have the same risk factor(s) as females who smoke up to a half a pack of cigarettes a day.

Race and ethnic background also are factors that cannot be changed but may impact the risk of cardiovascular disease. A study conducted by Rooks et al. (2002) demonstrated a significantly increased risk of high blood pressure and left ventricular hypertrophy in Blacks. Also the differences in health outcomes may be impacted by socioeconomic status, frequently seen in the racial disparities, thus increasing the risk for cardiovascular disease (Rooks et al., 2002).

Age is another risk factor that cannot be changed. Demonstrated in the Baltimore Longitudinal Study on Aging, in 2002, the heart and major blood vessels have a decrease in their ability to perform at maximum function with increased age. The left ventricular wall sustains an increase in thickness, decreasing elasticity and effectiveness of the pumping action of the heart. This causes the heart to have to work harder and sustain more stress (Lakatta, 2002). This risk factor will impact everyone that lives long enough. Currently, nothing is known that will stop the effects of aging. The goal is to alleviate any negative effects.

The last risk factor that cannot be influenced but needs to be assessed is genetics. A family history of cardiovascular disease before the age of 55 increases an individual's risk for the disease. For each first-degree relative that had some form of ischemic heart disease prior to the age of 55 the risk of

cardiovascular disease increases for an individual (Engberg, et al., 2002).

The focus for health care in outcomes management for cardiovascular risk reduction needs to be on the risk factors that can be impacted and decreased. Several behavioral factors, if reduced or eliminated, can decrease the overall risk of cardiovascular disease. Those risk factors include smoking, elevated cholesterol levels, and increased body mass index (BMI).

Risk Factors-Changeable

The first risk factor is smoking tobacco. Smoking is considered the most adverse behavioral risk factor for cardiovascular disease. If an individual is able to successfully stop smoking all types of tobacco that are inhaled, they will substantially decrease his/her disease risk. One year after smoking cessation, the risk of coronary heart disease decreases by 50%. When an ex-smoker has stopped for 15 years, the relative risk of dying from coronary heart disease is approximately the same as that for someone who has never smoked (American Heart Association, 2002). In the cardiovascular risk score calculation, smoking even small amounts (i.e., less than one half pack of cigarettes per day) dramatically increases the individuals overall risk score (Engberg, et al., 2002).

High blood cholesterol is also a risk factor that individuals can directly control with diet and exercise. High blood cholesterol is defined as a total blood cholesterol level of 240 milligrams per deciliter or higher. Cholesterol levels of 200-239 milligrams per deciliter are defined as borderline high risk (American Heart Association, 2002). Over one million adults in the U.S. have total blood cholesterol of greater than 200 milligrams per deciliter. The majority of these people have elevated cholesterol levels related to diet. Diet is frequently a learned habit, with increased cholesterol becoming more frequent in children and adolescents. It is therefore critical that proper nutrition begin in childhood.

Two other cholesterol measures assessed for risk of cardiovascular disease are the low-density lipoprotein (LDL), and high-density lipoprotein (HDL). The LDL cholesterol is frequently referred to as the "bad" cholesterol and the HDL cholesterol as the "good" cholesterol. The goal for the LDL level is 130 ml per dL or less. The goal for the HDL level is 40 ml per dL or higher. The HDL cholesterol has a cardio-protective measure; the objective is to increase the HDL number by exercise and diet.

One of the easiest things that people can do to reduce their risk of cardiovascular disease is to remain or become physically active through some form of exercise. The risk of

developing cardiovascular disease is 30-50% higher in people who are less active and less fit (American Heart Association, 2002). Physical activity is defined by frequency, duration and intensity level of the exercise. New guidelines have been released that recommend moderate activity on most days of the week. An example of moderate activity is brisk walking for approximately 30 minutes, five days a week (Haennel & Lemire, 2002).

As illustrated in Bray and Gray (1988), Table 1 describes the weight categories and risk of disease associated with BMI and waist size. Table 2 depicts BMI calculations/formulas used to calculate the BMI. A further risk factor that individuals can influence is their weight. The current standard uses a BMI scale to assess an individual's healthy weight. Body mass index is calculated by the height and weight of an individual to get the overall body surface area (BSA) using kilograms per meter squared (American Heart Association, 2002). The more body weight an individual has for their height, the greater the BSA and the BMI. An individual with a BMI of 25 or greater is considered overweight; an individual with a BMI of 30 or greater is considered obese. Approximately 24% of men and 27% of women in the U.S. are obese. As individuals age, their overall percentage of lean body mass decreases. Without making changes in lifestyle, a weight gain will happen with age. According to

the Framingham Heart Study (2002), both genders reach their greatest average BMI from ages 55-64, with a gradual decrease until they are in their mid 70s. Being overweight becomes a comorbidity factor for individuals with increased age (Wilson & Kannel, 2002). The more risk factors individual has the greater the chance for increased cardiovascular disease.

Table 1

Body Mass Index Chart

Risk of Associated Disease According to BMI and Waist Size			
BMI		Waist less than or equal to 40 in. (men) or 35 in. (women)	Waist greater than 40 in. (men) or 35 in. (women)
18.5 or less	Underweight	--	N/A
18.5 - 24.9	Normal	--	N/A
25.0 - 29.9	Overweight	Increased	High
30.0 - 34.9	Obese	High	Very High
35.0 - 39.9	Obese	Very High	Very High
40 or greater	Extremely Obese	Extremely High	Extremely High

Table 2

Height, Weight and Body Mass Index calculation

BMI (kg/m ²)	19	20	21	22	23	24	25	26	27	28	29	30	35	40
Height (in.)	Weight (lb.)													
58	91	96	100	105	110	115	119	124	129	134	138	143	167	191
59	94	99	104	109	114	119	124	128	133	138	143	148	173	198
60	97	102	107	112	118	123	128	133	138	143	148	153	179	204
61	100	106	111	116	122	127	132	137	143	148	153	158	185	211
62	104	109	115	120	126	131	136	142	147	153	158	164	191	218
63	107	113	118	124	130	135	141	146	152	158	163	169	197	225
64	110	116	122	128	134	140	145	151	157	163	169	174	204	232
65	114	120	126	132	138	144	150	156	162	168	174	180	210	240
66	118	124	130	136	142	148	155	161	167	173	179	186	216	247
67	121	127	134	140	146	153	159	166	172	178	185	191	223	255
68	125	131	138	144	151	158	164	171	177	184	190	197	230	262
69	128	135	142	149	155	162	169	176	182	189	196	203	236	270
70	132	139	146	153	160	167	174	181	188	195	202	207	243	278
71	136	143	150	157	165	172	179	186	193	200	208	215	250	286
72	140	147	154	162	169	177	184	191	199	206	213	221	258	294
73	144	151	159	166	174	182	189	197	204	212	219	227	265	302
74	148	155	163	171	179	186	194	202	210	218	225	233	272	311
75	152	160	168	176	184	192	200	208	216	224	232	240	279	319
76	156	164	172	180	189	197	205	213	221	230	238	246	287	328

Body weight in pounds according to height and body mass index.

"Cardiovascular disease is the leading cause of mortality and morbidity among people with diabetes mellitus" (MacLean, Joffres, Tann, & Petrasovits 2001, p. 373). Cardiovascular disease and diabetes mellitus have great co-morbidity. Many of the effects of poorly controlled diabetes may lead to cardiovascular disease. The American Diabetes Association

defines the criteria for diagnosis of diabetes as having fasting blood glucose of 126 milligrams per deciliter or higher (American Heart Association, 2002).

There is conflicting research published on the risks and benefits of alcohol consumption and the possible risks or benefits to the cardiovascular system. In a study conducted correlating wine and beer consumption in comparison to cardiovascular risk, modest amounts of wine were demonstrated to give some protection against cardiovascular disease (Castelnuovo, Rotondo, Iacoviello, Donati, & Gaetano, 2002). However, it is well documented that heavy drinkers (i.e., greater than three drinks a day) are at an increased risk for many types of cardiovascular disease (Klatsky, 2002). All of the research reviewed recommended that any drinking of alcohol be done in moderation for multiple health reasons.

Methods and Procedures

The first step of the project was to develop a scorecard as identified in Appendix A, which will be used by providers to screen individuals for cardiovascular disease risk factors. The American Heart Association and the Framingham Heart Study screening forms were the base for developing the scorecards, along with augmentation from literature sources and by the direction of the cardiology department at MAMC. The scorecard was loaded into the Integrated Clinical Database (ICDB)

currently being utilized at MAMC. The ICDB is an automated patient record that permits providers to track their patients scheduled appointments, medications, laboratory and radiology tests, and recent visits to the emergency department. The other MTFs in the WRMC and TRICARE Region 11 already have, or will soon have the ICDB.

The initial phase of implementation of the cardiovascular risk reduction program took place at Fort Lewis, Washington, McChord Air Force Base, Washington, Naval Hospital Bremerton, Washington, and Naval Hospital Oak Harbor, Washington. A provider from each location was assigned as the champion for the cardiovascular risk reduction program. Once the scorecard was developed and approved by the assigned champions then a relative value was assigned to each of the risk factors concurrent with the risk factors in the literature. Once the scoring values were complete, they will be stratified into low, moderate, or high-risk categories for cardiovascular disease and then followed by their primary care manager.

An outcomes metrics was developed and identified in Appendix B. The metrics were defined and benchmarks set utilizing the National Committee for Quality Assurance (NCQA) national averages for clinical measures. The specific time frame for each metric was also defined at this point. The Health Outcomes Management office program analyst pulled the

data from the Military Health System Management Mart (M2) analysis tool, for TRICARE Northwest prime enrollees. At a later date, all TRICARE beneficiaries can be evaluated. Using the questions from the cardiovascular risk reduction scorecard, multiple cohorts for the study were identified. The data collected were from calendar year 2002.

Once the size of the population to be sampled was determined from the prime enrollees, a random sample size estimator calculator was utilized to determine the overall sample size needed for each cohort using a 95% confidence level (Wilson & Chao, 2002). Once the sample size was determined, the individual MTF Defense Military Information System (DMIS) codes identified the cohorts in proportion to the enrollment at each MTF. Individual chart reviews were conducted to gather the needed data if they was unavailable through M2 or ICDB.

Once the systems are set up and in place, providers will begin screening for cardiovascular disease in their patients utilizing the scorecard. When a patient is identified as high or moderate risk, he/she will be given the appropriate treatment and consultation. Once he/she is identified as high or moderate risk, his/her information can be tracked so that he/she can be medically tracked to assist in achieving the desired outcomes. The overall goal is to see a decrease in the disease process

(es) by reducing risks and administering the suitable preventative measures and treatments.

Confidentiality

The cohorts were established and, when necessary, data were gathered from the patients' records through a retrospective records review. All specific identifying information was eliminated in order to protect the confidentiality of the beneficiaries. During this data pull and record review, the strictest patient privacy and confidentiality was maintained. The data analyst maintained all information gathered from M2 or ICDB on a secure computer or floppy disk.

Validity and Reliability

It is assumed that the guidelines from the American Heart Association and the Framingham Heart Study are valid and reliable, but the questions will be validated with current literature and recommendations of the program by the medical staff. The NCQA national averages were utilized for clinical measures, as were the recommendations from Healthy People 2010, from the health plan employer data and information set (HEDIS) indicators (National Committee for Quality Assurance, 2002). The data obtained by the MHS were assumed to be reliable and valid after reviewing a sample of patient charts for supporting documentation. MAMC has a data quality manager who tracks and corrects issues with data quality.

Results

Establishing a cardiovascular risk reduction program, initially in the Puget Sound area and eventually throughout the Western Region and TRICARE Region 11, will assist providers in identifying beneficiaries at increased risk for some type of cardiovascular disease. The scorecard developed for the program is now being utilized in MAMC's outpatient primary care clinics by the beneficiaries and providers. It is linked into ICDB so that the providers have a simple and convenient way to use the program.

The program developed cohorts to evaluate the metrics that were established. The computer used a sample of the entire population in the region. The sample was large enough to draw some overall inferences about the entire population. These metrics identified the percent or percentage of beneficiaries that were receiving a specific treatment or engaging in specific behaviors.

The overall results of cardiovascular risk reduction demonstrate that some parts of the program are achieving the goals of the standards of patient care, while others are not. These results can now be shared with the providers throughout the region so they can evaluate the care of their empanelled group of beneficiaries. The specifics of each metric evaluated will be discussed in depth in the discussion. Overall, some of

the results of the program were not a surprise, however, the study gave numerical support for the beliefs of the staff. The majority of the medical staff thought that the overall cardiovascular health of the sample of beneficiaries remains at risk. Without some intervention, many of these beneficiaries may have cardiovascular complications. An example was the number of beneficiaries with documented diagnosis of hypertension who also had a documented use of some form of tobacco. With this documented information, the command at MAMC hired an employee to focus completely on tobacco cessation especially in the beneficiaries with cardiovascular disease. The belief by the cardiologists in the region was that the vast majority of patients, post acute myocardial infarction, were receiving beta-blockers. The study demonstrated this clearly was not the case and that the current medical practice by many of the providers needs to change.

The cardiovascular risk reduction program was established at MAMC and other MTFs to study a serious health concern that greatly impacts soldier readiness, current and future medical expenditures, and overall quality of life. The first step in designing the program was to establish the outcomes metrics. Fourteen metrics were initially established for the program. One metric was eliminated due to lack of available data. The remaining 11 metrics will be included in the discussion. On

some graphs, two of the metrics were combined to compare the different age categories. The last two metrics will be discussed in the Recommendations Section. The prime enrollees were divided into three categories: active duty, non-active duty male age 35-85, and non-active duty females age 45-85. The age difference for the genders is due to the cardio-protective factor for women until approximately age 50. The initial step was identifying the TRICARE prime enrollees.

Table 3 illustrates the TRICARE prime enrollment in the Puget Sound area as of October 2002. The four MTFs in the table are Madigan Army Medical Center (MAMC), Naval Hospital Bremerton (NHB), Naval Hospital Oak Harbor (NHOH) and the McChord Clinic, 62nd Medical Group (62nd). All of these medical treatment facilities enroll beneficiaries to a primary care manager (PCM). The PCM in these facilities can be a physician, a physician's assistant, or a nurse practitioner.

The definition of the numerators and the specific size of the denominator cohorts were established using a random sample size estimator in order to determine the appropriate size sample for the study. The sample size for the region was determined after the enrollment population was run through M2 and ICDB for the specific diagnosis. The denominator changes with each medical treatment facility and each metric that information is gathered.

Table 3

Puget Sound area TRICARE Prime Enrollment

<u>MFT Enrolled</u>	<u>Active Duty</u>	<u>NAD Male</u>	<u>NAD Female</u>
MAMC	9,934	7,779	7,333
NHB	468	3,238	2,480
NHOH	1,802	1,288	1,092
62nd Med Group	2,562	1,372	1,051
Regional Total	14,766	13,677	11,956
Combined Total			40,399

The first cohort analyzed was enrollees age 46-85 diagnosed with hypertension, within the first six months of the measurement year. The second cohort was enrollees age 18-45 diagnosed with hypertension within the first six months of the measurement year. The first metric was defined as the percentage of the first two cohorts with a blood pressure less than 140/90. The raw numbers and percentages for this metric can be found in Appendix C. The study used the HEDIS indicators of 140/90, however, for clinical practice in the scorecard, the standard established a little tighter control of the blood pressure at 135/85. The 140/90 was utilized in order to use a national benchmark against which to evaluate the region.

Figure 1 illustrates the results of the first metric with both age categories. These beneficiaries all have hypertension. As stated earlier, this diagnosis has associated co-morbidities with development of cardiovascular disease. Of these beneficiaries within the region, 62.5% of the individuals in the age category 18-45 and 60.4% of individuals in the age category 46-85, now have blood pressures in acceptable ranges after treatment. This still leaves approximately 40% of the beneficiaries with this diagnosis who continue to have blood pressures that exceed the acceptable range. This 40% is alarming, since they are receiving treatment and their recorded blood pressure is still viewed as uncontrolled. Many providers are treating the hypertension, but the treatment is not achieving the goal for the blood pressure.

The goal of diagnosing and treating a patient who has hypertension is to reduce the blood pressure to a healthy range so he/she does not suffer from one or more of the different cardiovascular diseases. With approximately 40% of the regional cohort studies with this documented hypertension exceeding the recommended blood pressure range, even after treatment, the MTFs still have a lot of work ahead of them to achieve the goal of successful treatment of hypertension.

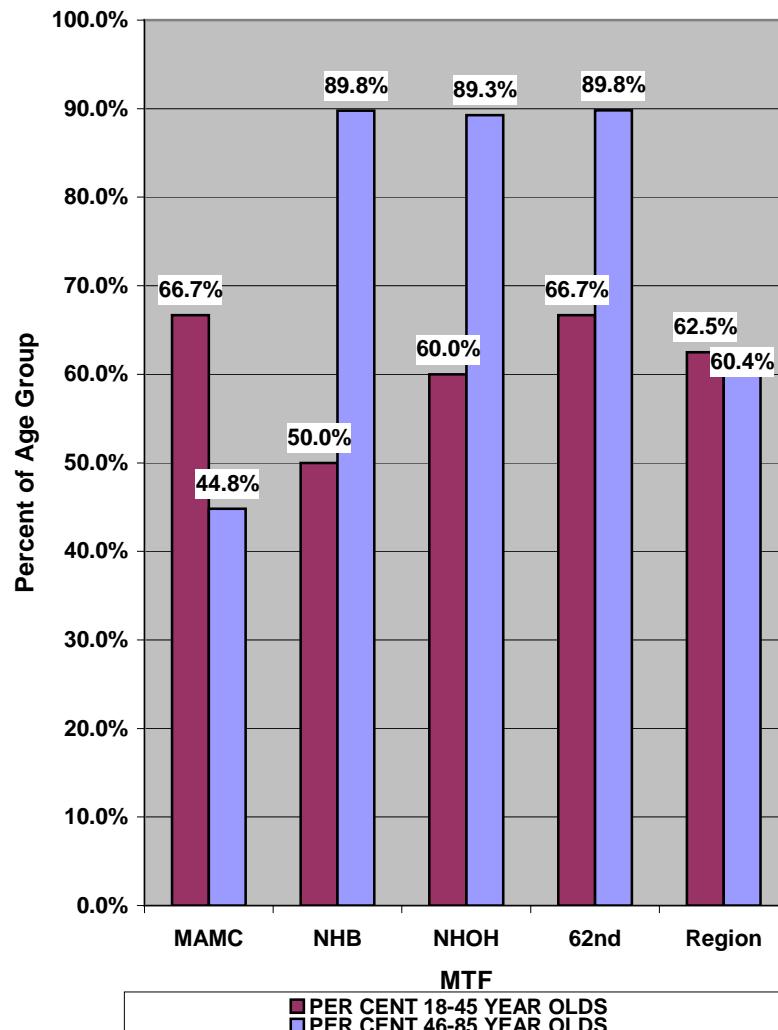


Figure 1.

Percentage of prime enrollees age 18-45 and 46-85 diagnosed with hypertension and having a blood pressure of less than 140/90

Figure 1 also shows that in all MTFs except MAMC, the age group from 46-85 had a higher rate of unsuccessful treatment of

hypertension. These individuals remain at increased risk of some type of adverse cardiovascular event, which may have increased lethality due to the underlying hypertension. The reason for this outcome is unknown, but it may have something to do with the number of physicians working in specialty care. Such physicians often treat the older population and are more familiar with complicated hypertension cases.

Figure 1 demonstrates the extreme variation in the different medical treatment facilities. It would be expected that the age group 46-85 has a higher number of uncontrolled hypertension cases. All of the medical treatment facilities, except MAMC, have a limited number of specialists assigned to the hospital/clinic, if any at all. Naval Hospital Bremerton has a specialist assigned, however he/she has an almost 90% control rate for the age group 46-85. Many of the providers at Naval Hospital Bremerton were deployed in 2002. Although providers are still expected to meet the TRICARE prime standard or refer the patients to the network. However, many of the patients opt to wait and see a military provider even if the wait is outside of the access standards. This MFT has the lowest rate of hypertension in the 18-45 year old group. This group needs much closer monitoring and tighter blood pressure control. Frequently, people in this age group are believed to

be mostly healthy; when a health issue arises, they may not be monitored as closely as the older population.

The following metric examined was the same cohorts and age group who were diagnosed with hypertension and who also used some form of tobacco. The tobacco use was documented in either the medical record or ICDB. The number and percentage of beneficiaries with a known diagnosis of hypertension and who also use tobacco are included in Appendix D. Figure 2 illustrates the percentage of people with the co-morbidity of hypertension and tobacco use. This extremely high number of beneficiaries with the co-morbidity of tobacco use, for cardiovascular disease was surprising. Many of the health care providers believe that they are discussing the risks of tobacco use with the patients who have hypertension, but the results demonstrate that these discussions are not decreasing the number of patients who are actually using tobacco.

All the MTFs are failing at convincing their hypertension and smoking patients with to stop using tobacco. This is an issue that must be addressed by each of them in an effort to decrease tobacco use. With the well-documented and reported adverse effects of tobacco use, the number of individuals still using tobacco, especially with a known diagnosis of hypertension is disconcerting.

Some of the patients have reported that they are aware of their hypertension diagnosis. Consequently, since they are being treated for the disease process, they believe that everything is being done to take care of the disease. The data demonstrates a lower number for this metric than the actual number of beneficiaries who use tobacco since it is self reported or gathered from medical records. Some individuals under report their use of tobacco.

The next metric examined was the percentage of TRICARE prime beneficiaries over the age of 34 that were discharged with a prescription beta-blocker after an AMI. The time frame established by the HEDIS indicators was seven days post discharge. Beta-blockers are recommended for individuals post AMI to help reduce the chance of another MI or other acute cardiac event. If the patient does have a contraindication for a beta-blocker then the provider needs to assess what other possible medications can offer a similar benefit. The number of patients and the percentage of people discharged on beta-blockers after an AMI are quite small see (Appendix E). The outcome of the low number of patients on a beta-blocker surprised providers, who believed that they were appropriately treating these patients. The values for this metric are illustrated in Figure 3.

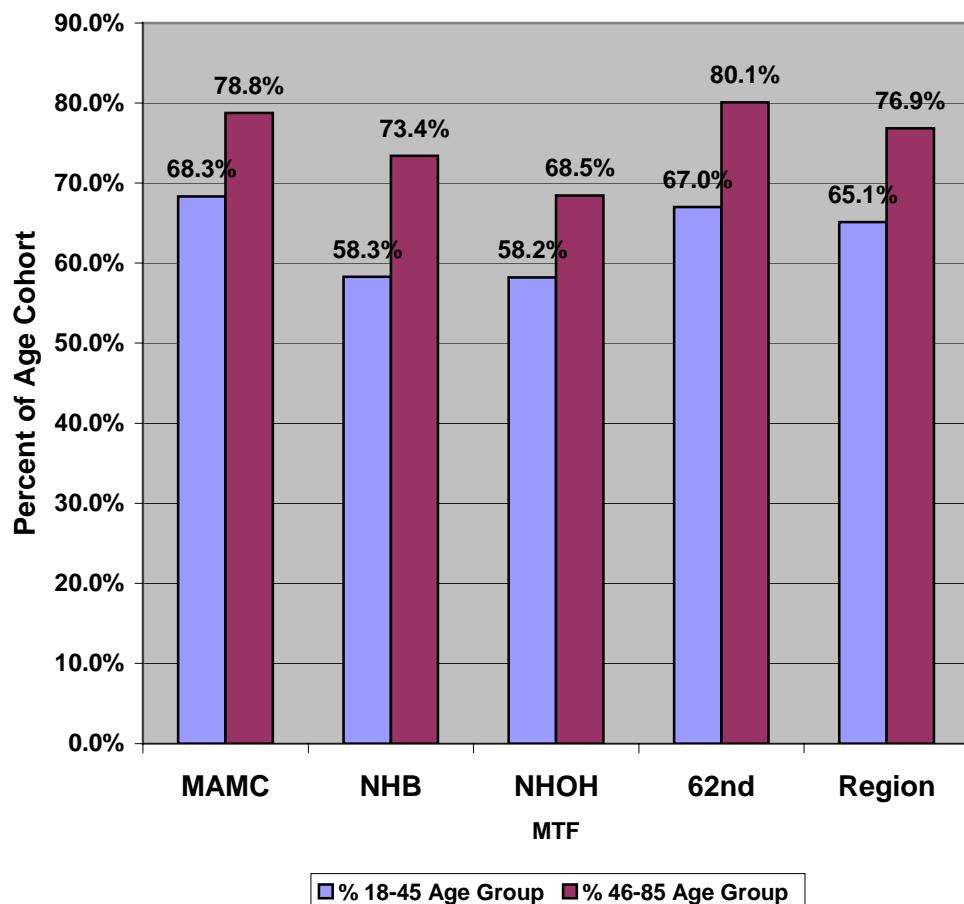


Figure 2.

Percentage of enrollees in age groups diagnosed with hypertension and who use tobacco

After examining the results of the metric of patients on a beta-blocker, the use of beta-blockers was identified as a low

throughout the region. It is necessary to provide education on the standard of care for beta-blockers. The extremely low use of beta-blockers post discharge, after an AMI is a cause for concern. This result was shared directly with the providers to increase the awareness of the recommended medical care post AMI.

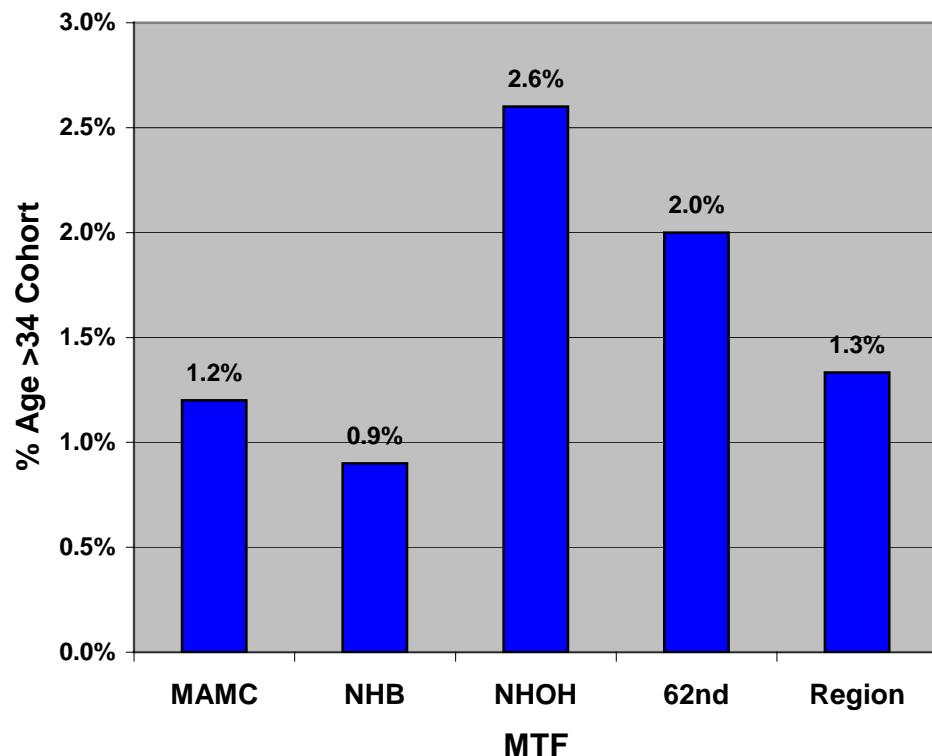


Figure 3.

Percentage of enrollees over the age of 34 discharged with a diagnosis of acute myocardial infarction on a beta-blocker

The health outcomes management team will follow this metric very closely in the next few quarters. The providers were also educated about this standard and results after the percentages were calculated. Now that the providers have an understanding of the expected goal and know it is being measured the expectation is that the overall percentage will increase. The team realizes that it cannot dictate how to practice medicine; it wants to keep the providers informed of the most up-to-date standards of care and challenge the providers to look at their own practice patterns on an individual patient basis.

The following metric examined was patients discharged from a hospital one year prior to the measurement year with a diagnosis of AMI, a percutaneous transluminal coronary angioplasty (PTCA), or a coronary artery bypass graft (CABG). These patients should be screened for an (LDL-C) between 60 and 365 days post discharge. Included in this screening are the number and percentage of patients screened for their LDL-C in the prescribed time frame per the HEDIS indicators. The data pertaining to this metric can be found in Appendix F. Figure 4 shows the results of this metric. Overall, the region is screening for the LDL-C in almost 60% of the patients. This leaves 40% of the patients who were not screened for their cholesterol level after a serious or life

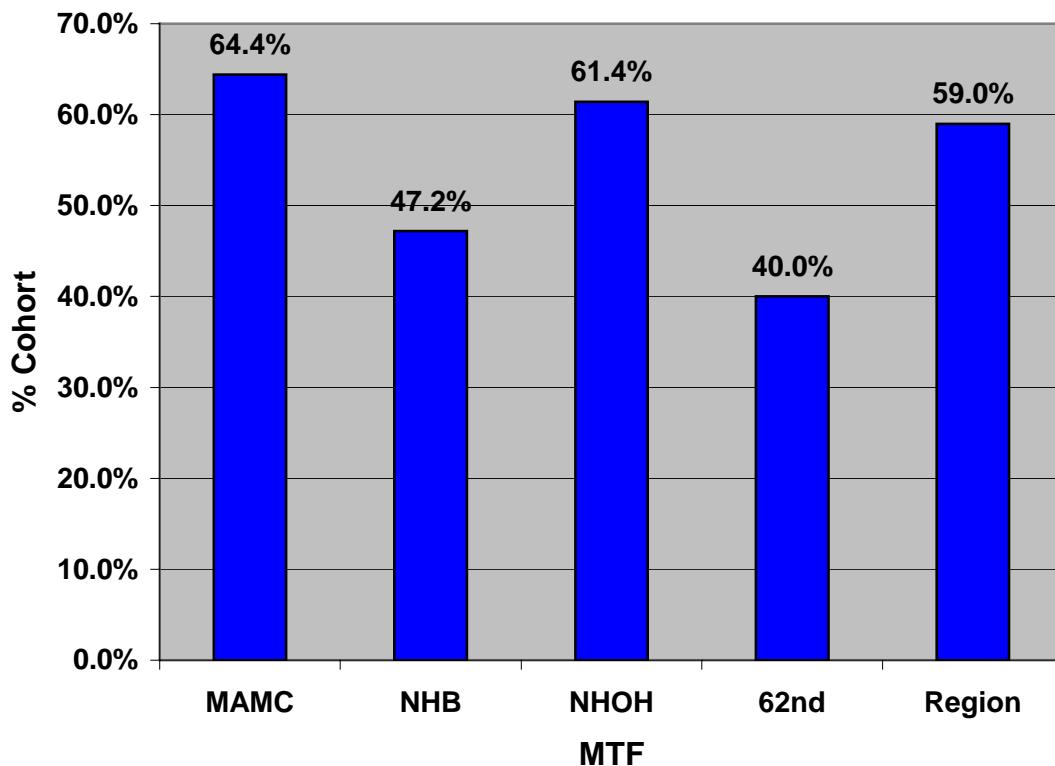


Figure 4.

Percentage of enrollees discharged with AMI, PTCA or CABG
screened for LDL-C from 60 to 365 days after discharge

threatening cardiac event. All region 11 MTFs have a relatively low rate of screening for the LDL after patients are discharged from the hospital with the diagnosis of AMI, PTCA, or CABG. However, a simple blood test is all that is required and is critical for patients with cardiac disease histories. All these

patients will require follow-up after discharge. A simple solution for this problem is to order the blood test, to be performed 60-90 days post-discharge, at the time of discharge. This metric is also going to be followed closely every quarter by the health outcomes management team.

For individuals that were screened for a LDL-C during the 60-365 day post discharge interval, the next step was to assess the LDL-C cholesterol level. The goal for these patients is a LDL-C less than 130 mg/dL. The exact number and percentage of beneficiaries with LDL-Cs of less than 130 mg/dL, if they were diagnosed with one of the specific cardiovascular conditions, is identified in Appendix G. Figure 5 demonstrates the rate of compliance with the LDL-C of less than 130 mg/dL. Since not all patients were tested for the LDL-C, the region has a very high rate of compliance and achieving the goal of less than 130 mg/dL, however, some patients that were not tested for the LDL-C. This metric is critical to track since the HEDIS indicator and clinical practice standard an LDL-C below 130 mg/dL. An LDL-C of greater than 130 mg/dL has a high morbidity for patients with cardiovascular disease. For some patients, it is necessary to set a goal at less than 100 mg/dL.

Naval Hospital Bremerton is the only hospital that has not achieved the goal of 75% of their patient's with a LDL-C of less than 130 mg/dL. This result was shared with the team

representative from Naval Hospital Bremerton so he/she can bring it to the attention of his/her command and providers. However, this metric cannot stand alone. Overall, results of this metric are good, but it is concerning the not all patients had a LDL-C ordered. The metric needs to be assessed with the metric that assesses the number of LDLs ordered 60-365 days post discharge for patients with AMI, PTCA or CABG. If the provider does not evaluate both metrics concurrently, he/she cannot get a clear picture regarding the overall cardiovascular risk to the patient.

The subsequent metric in the risk reduction program is the percent of active duty tested for cholesterol during the first six months of the measurement year. These patients were subsequently screened for HDLs, LDLs, and triglycerides during the measurement year. The number and percentage screened for all types of lipids in the active duty population are identified in Appendix H. Figure 6 illustrates the results of this metric. Throughout the region, providers are screening more than 70% of the individuals for all the types of lipids not merely testing for total cholesterol. This test does not require any additional blood to be drawn from the patient. These tests give the providers a more complete assessment of the patients' overall blood lipid status.

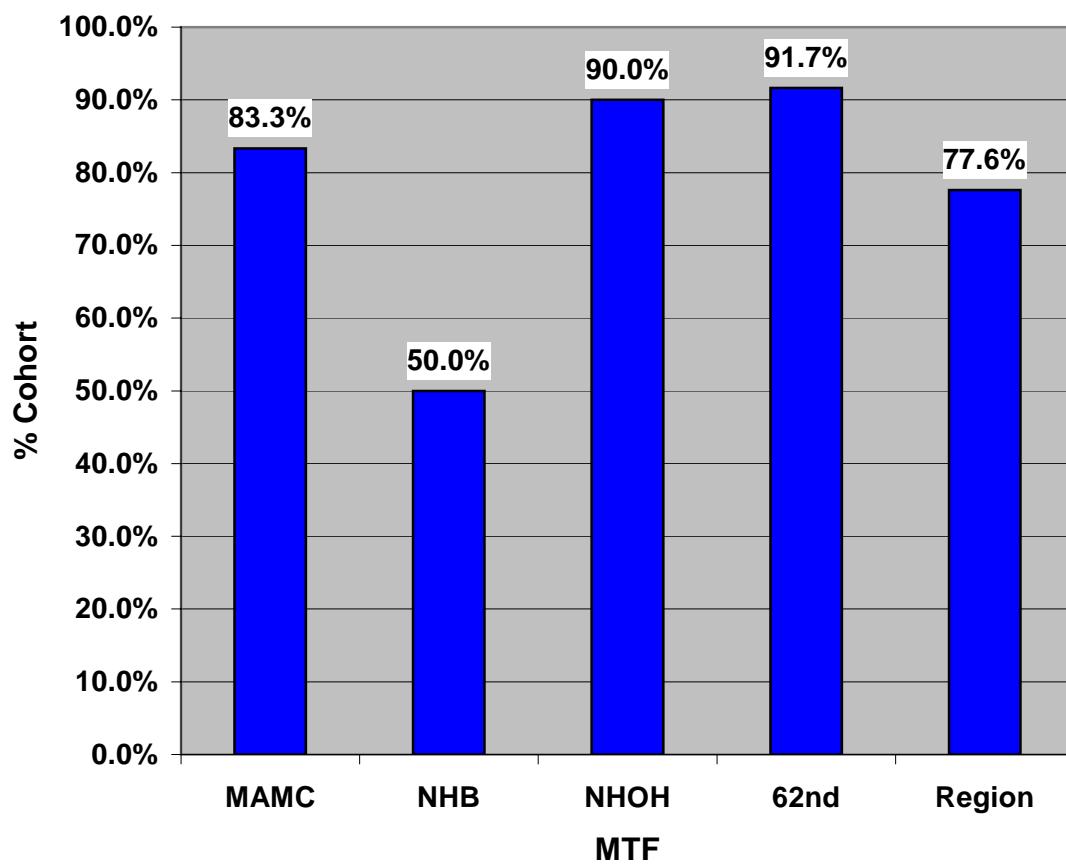


Figure 5.

Percentage of enrollees diagnosed with AMI, PTCA or CABG who had a LDL-C of less than 130 mg/dL 60-365 days post discharge

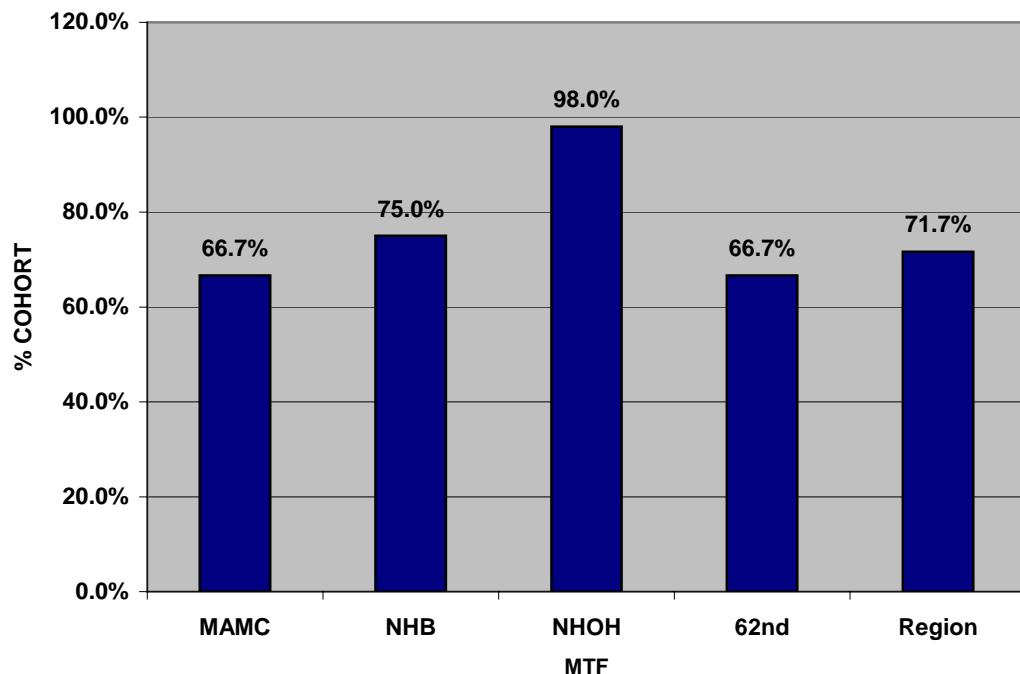


Figure 6.

Percentage of active duty tested for total cholesterol who were also screened for HDL, LDL, and triglycerides

Currently, Naval Hospital Oak Harbor is the only MTF achieving the goal of testing for all types of lipids. After the providers are educated, the hope is that all MTFs achieve greater than 95% success with this metric. One issue that may be difficult to overcome is that active duty personnel are usually healthier than the retired population. As a result of this perception, some providers do not see the need to get the

complete lipid panel if the beneficiary's total cholesterol is within the normal range.

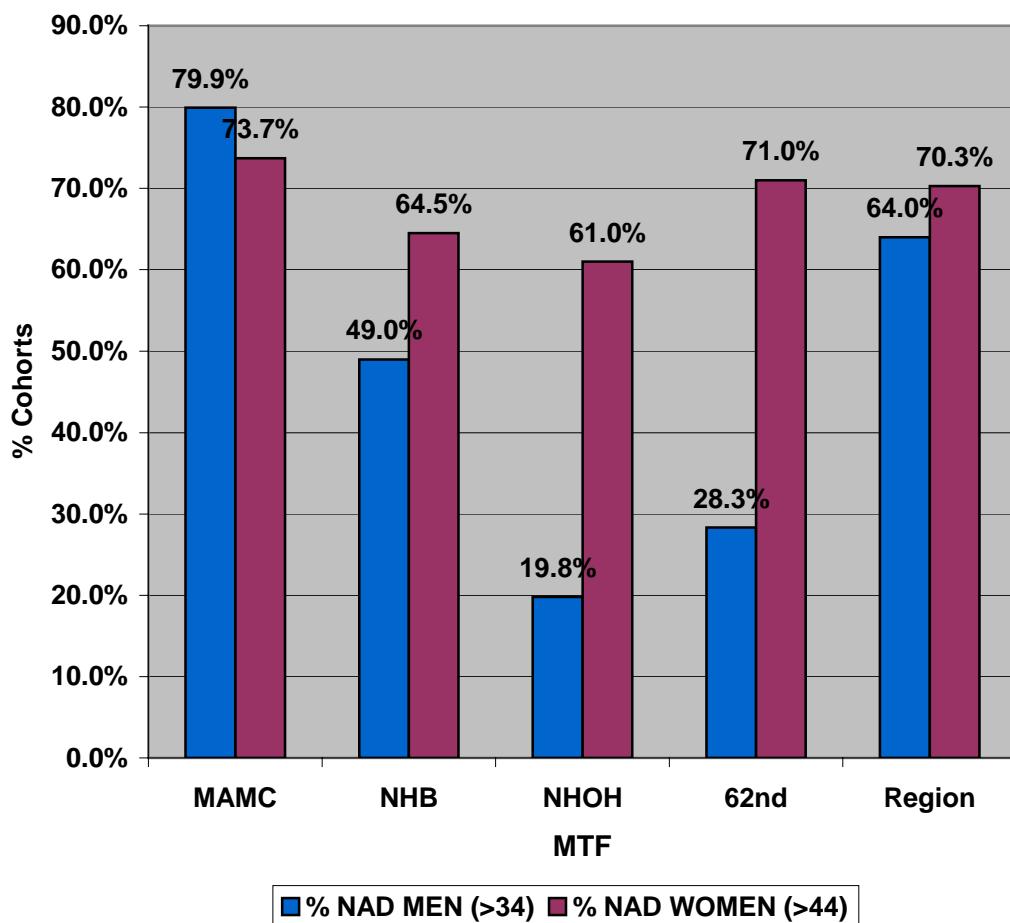


Figure 7.

Percentage of non-active duty men greater than 34 and women greater than 44 years of age with a cholesterol of greater than 200 mg/dL who had follow up test of HDL, LDL, and triglycerides

The next metric evaluated was the non-active duty male and female with an elevated total cholesterol greater than 200 mg/dl who were then followed up with HDLs, LDLs, and triglycerides testing by the end of the measurement year. The age used to query for men was greater than 34 and for women was greater than 44. The numbers and percentages for non-active duty that had total cholesterol greater than 200 and screened for all types of lipids are included in Appendix I. Figure 7 highlights this metric for all the MTFs in the region.

The final metric evaluated was the emergency room visits per 1000 and the number of occupied bed days per 1000 enrollees. The beneficiary had to be discharged after an AMI, a PTCA, or a CABG at a minimum of one year prior to the measurement year. The number and percentage of emergency room visits and bed days per 1000 beneficiaries is included in Appendix J.

Figure 8 reveals the results of this metric. The number of emergency room visits per 1000 averages, for the region, are slightly greater than 135. This is an appreciably larger usage of the emergency room for beneficiaries with the targeted diagnosis. The number of bed days per 1000 throughout the region is 40.6, which was representative for this diagnosis. This metric, as with all the metrics, will be monitored. However, since this was the first time this metric was measured, it was difficult to compare it to anything other than the

national average. Once the program has been underway, results will provide greater information to providers and commanders.

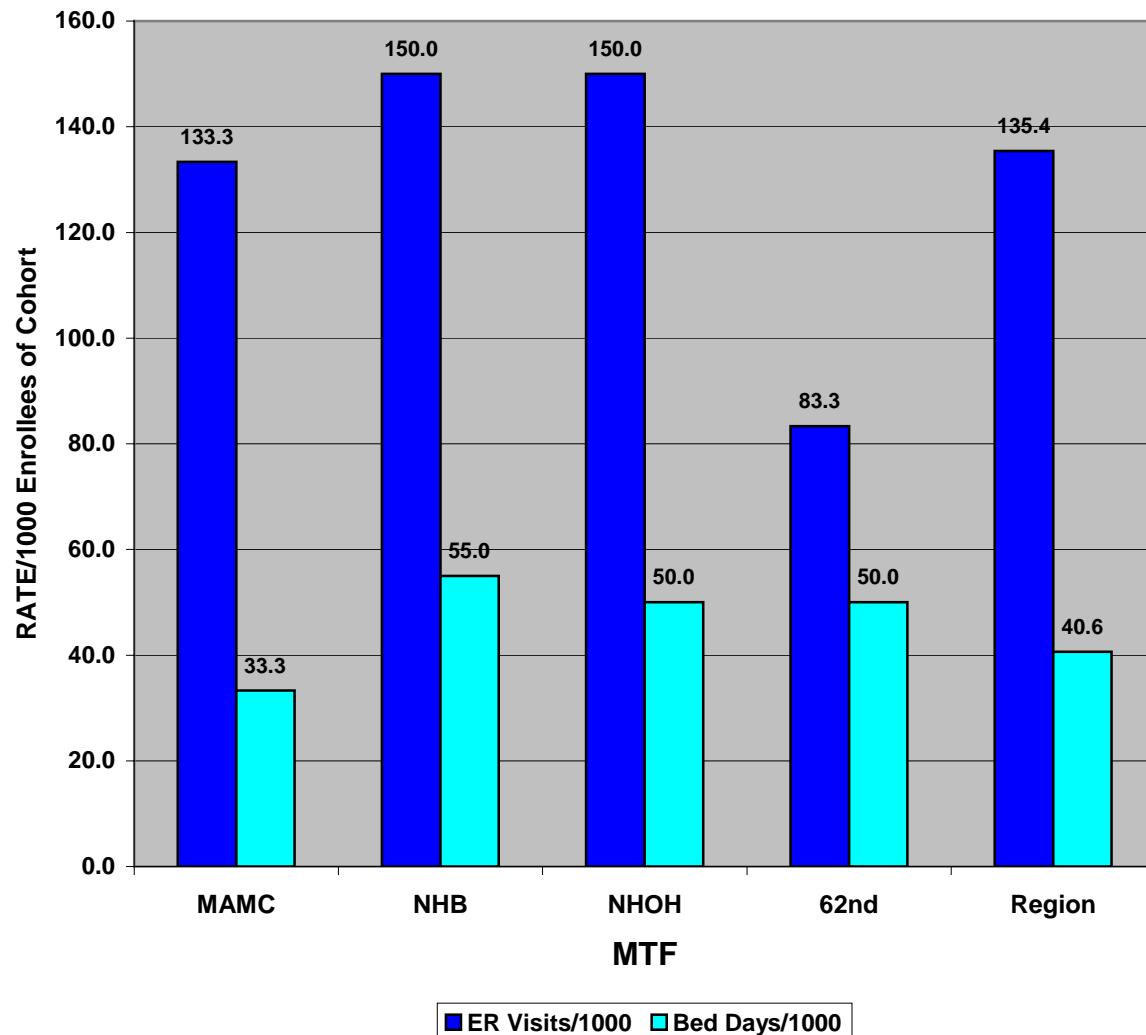


Figure 8.

Emergency room visits per 1000 and bed days per 1000 enrollees who were discharged with a diagnosis of AMI, PTCA, or CABG within one year

Discussion

The cardiovascular risk reduction program was established as part of the health outcomes management program at the WRMC. Outcomes management was first seen on a large scale in the U. S. Army at Walter Reed Army Medical Center (WRAMC). Madigan Army Medical Center adopted the philosophy of outcomes management when the new commanding general who had commanded at WRAMC. The first phase of the program demonstrated a need for greater follow up of patients with or at high risk for cardiovascular disease, and the implementation of the cardiovascular risk reduction scorecard.

The number of beneficiaries with cardiovascular disease was not surprising. However, the number of beneficiaries with uncontrolled hypertension who were identified and being treated for hypertension was surprising. Unknown were the number of patients who continue to use tobacco, despite a diagnosis of hypertension. Providers are administering appropriate care to their patients and are making every effort to stay current on recommendations produced by disease management. However, when the providers are shown specific metrics they are reminded of the need to follow up with their patients on all the recommended areas in cardiovascular health. Modifying behaviors, in beneficiaries with some form of cardiovascular disease, will decrease their risk of suffering a major cardiovascular event.

An assessment of beneficiaries' understanding of the dangers of tobacco use dangers needs to be conducted to gain insight on how to best focus educational programs. The region is focusing on educating providers and patients on tobacco cessation. Due to the study, two more staff members have been hired in the health outcomes management department. One, a nurse will follow up on patients admitted to MAMC with a cardiovascular disease diagnosis. That nurse will also be available for consultation throughout the Northwest region and TRICARE Region 11. The second employee is not directly hired for cardiovascular risk reduction, but for tobacco cessation classes and consultation. This individual will work with all beneficiaries but specifically with individuals with a disease process that may be attributed to some form of tobacco use.

The cardiovascular risk reduction program coordinator needs to continue to assess the data and information gathered. After the program has been running for an entire calendar year, the data should be re-evaluated to determine if the numbers from 2003 are consistent with year 2002. A year of data will draw a more complete picture of the program and should demonstrate improvement in the measured metrics. This will enable the medical staff to incorporate the recommendations of the new staff members and the information from the program and continue to progress.

Although the results were not tracked for this study, two additional metrics in the program are cardiovascular risk reduction scorecards and the surveys. They are slowly being initiated and completed by the providers at MAMC. The active duty providers who did not deploy are starting to use the scorecards. Due to many changes of staff, it is recommended that the main phase of implementation of the scorecards begin when the core provider staff of MAMC returns from the deployment with the 47th combat support hospital (CSH). This cardiovascular risk reduction study has been the pilot implementation of the entire project. When the providers return from the deployment, they will be able to initiate the full program using their knowledge of treatment plans and programs already in place within the MTF. This will enable providers to utilize one tool to assess the cardiovascular disease risk and then educate the beneficiaries their individual risk of the disease. Madigan Army Medical Center had anticipated having this part of the program initiated in February of 2003. However, with the war and the great number of deployments, this one area of the program had to be delayed. Full utilization of the scorecards will most likely begin in the Fall of 2003.

The health outcomes management team also reviewed some educational program currently on the market. The Pfizer in charge program was selected as the patient education program

that will supplement the program at MAMC. Other military MTFs, as well as some civilian hospitals and physicians offices, are currently utilizing this program. The program, if used by MAMC, will permit providers to enroll voluntary patients and give them educational information about cardiovascular disease. The program has videotapes that are sent to the patient for instructions on diet, exercise, and medications, as well as what kinds of monitoring to expect for their disease process. If the entire program is utilized by the providers at MAMC, then they would be given access to an interactive web site that permits them to input demographics and minor medical histories which would then calculate the patient's risk of cardiovascular disease. With this program, patients can see the risk that they can manage by stopping smoking or controlling their weight.

The American Heart Association's, "How's Your Heart Program" is excellent and recommended for use within the MTFs. This program focuses mainly on inpatient care and ensuring that specific things are done for patients who have cardiovascular disease and require inpatient care from an illness. This program may be used by the providers caring for inpatients and can be monitored by the new staff member hired specifically for cardiovascular disease management.

The management implications for the organization include financial support, personnel, staff education and training, and

clinical outcomes. Anytime a new program is implemented, both direct and indirect costs must be realized for the organization. The direct cost will be realized with hiring of new staff members, and the cost attributed to running more laboratory tests and ordering more medications.

The program requires more clinical and administrative staff support. The organization needs to devote the personnel to run the program. One person would be able to manage the majority of the program, with some administrative support to run the data. The program director needs to conduct provider staff education and training on the program to ensure its continued success.

Positive clinical outcomes of a successful program will, in the long run, save the organization financial and personnel resources. High-risk beneficiaries that are able to decrease their risks of cardiovascular disease will decrease their hospital and medical costs to the organization. The entire organization will benefit since the providers who had to focus a significant amount of time on these patients will now be able to spend their time seeing other patients.

Conclusions and Recommendations

The study demonstrated that the providers were not aware of all of the standards of care for cardiovascular disease risk reduction. The care being provided in the MTFs throughout the Northwest Region and TRICARE Region 11 is excellent. However,

the MTFs and providers place different emphases on areas of care. This study is not trying to dictate the practice of medicine by the providers, but to give them a guideline to initiate and follow, when appropriate, depending on the specific needs of each patient.

The program examined the prescribed metrics and gave quantifiable data of how well or how much room for improvement the MTFs had in the outcomes management of cardiovascular disease. The study verified that all of the MTFs have room to improve with most of the metrics. It will be up to their individual commands to focus specifically on the metric, gender, or age group that needs the most attention. The most noteworthy metric with room for improvement throughout the MTFs is the use of beta-blockers for patients post-AMI; all of the MTFs had extremely low compliance with this metric. It was identified that the providers had an extreme knowledge deficit of this standard of care, which was resolved by staff education. Currently the program does not identify individual providers, although it could be resolved by compliance, based on education. This could be done at a later time.

The implementation of a strong cardiovascular risk reduction program requires command and provider support. The command must financially back the program in order to realize the greatest benefit(s). To implement the program at a large

MTF, a program director must be hired to manage the program and to assist the providers in implementation. This individual should have a strong clinical background and an interest in cardiology. The individual will be required to perform staff education of the program and meet with the providers to get input on revising the program from the end-user level. The program must also educate the beneficiary population, both those with the disease or risk factor and those without. Much of this education can be coordinated with the Community Health Nursing Department.

These metrics need to be followed on a quarterly basis with the information provided to all of the providers throughout the facility. The providers need to understand the current recommendations and the benefits of health management in reducing cardiovascular events. The scorecard and the survey will also be beneficial in understanding the specific issues with each patient. These tools are easy to use and provide valuable information.

Appendix A

Cardiovascular Risk Reduction Scorecard				
Score	Edit	Question	Response	Date Completed
	Edit	Patient blood pressure < 135/85 mm Hg?		
	Edit	Patient BMI< or = 25		
	Edit	Non-smoker or quit smoking > 6 months ago?		
	Edit	Alcohol: drinks no more than one drink per day for women; two drinks per day for men?		
	Edit	Patient has been advised or a low salt diet?		
	Edit	Patient low-density lipoprotein (LDL)< 130mg/dL?		
	Edit	Patient has high-density lipoprotein (HDL) >39mg/dL?		
	Edit	Medical nutrition assessment within the last 12 months if patient has CHD, MD, HTN, hypercholesterolemia, BMI >25		
	Edit	Patient engages in regular exercise program >20 minutes at least 3X per week?		
	Edit	Family history of premature CHD (CHD in male first-degree relative <55 yr; female first-degree relative <65 yr?		
	Edit	Male <45 yrs.; Female <55 yrs?		
	Edit	Patient has CHD documented (MI, Angina, stenosis)?		
	Edit	Patient has CHD risk equivalent disease (Diabetes, Peripheral Artery Disease, Abdominal Aortic Aneurysm, symptomatic carotid artery disease) and LDL < 100 mg/dL		
	Edit	Patient has >or= 2 risk factors or known CAD and LDL < 100mg/dL?		
	Edit	Patient with > or = 2 risk factors or known CAD taking aspirin?		
	Edit	Status post MI or beta-blocker?		
	Edit	Status post MI assessment of LV function performed?		
	Edit	Assessment for reversible ischemia in patients with known EF < 50%?		
	Launch	PRIME-MD completed within last 12 months if patient has CHD, HTN, hypercholesterolemia, BMI >25?		
	Launch	How's Your Health questionnaire completed within last 12 months?		
	Launch	Patient satisfaction completed this year?		

Appendix B

OUTCOMES METRICS
CARDIOVASCULAR RISK REDUCTION

Definition of Denominator of the Cohort

- #1 Age 46-85 with the diagnosis of Hypertension during the first six months of the measurement year.
- #2 Age 18-45 with the diagnosis of Hypertension during the first six months of the measurement year.
- #3 Age greater than 34, discharged with an acute myocardial infarction during the measurement year.
- #4 Age 18-75 discharged with a diagnosis of acute myocardial infarction, Percutaneous Transluminal Coronary Angioplasty or Coronary Artery Bypass Graft one year prior to the measurement year.
- #5 Age 18-65 Active Duty tested for total cholesterol during the first six months of the measurement year.
- #6 Age 35-75 Non-active duty males whose total cholesterol was over 200 mg/dL.
- #7 Age 45-75 Non-active duty females whose total cholesterol was over 200 mg/mL.
- #8 Number of total prime enrollees age 35-75.

Metric Definitions

- Metric #1: Percent of #1 cohort with BP < 140/90.
- Metric #2: Percent of #2 cohort with BP < 140/90.
- Metric #3: Percent of #1 cohort who uses tobacco.
- Metric #4: Percent of #2 cohort who uses tobacco.
- Metric #5: Percent of #3 cohort on beta-blockers within seven days post discharge.
- Metric #6: Percent of #4 cohort screened for LDL-C 60-365 days post discharge.
- Metric #7: Percent of #4 cohort with LDL-C <130 mg/dL 60-365 days post discharge.
- Metric #8: Percent of #5 cohort screened for HDL, LDL and Triglycerides by the end of the measurement year.
- Metric #9: Percent of #6 cohort tested for HDL, LDL and Triglycerides by the end of the measurement year.

Appendix B Cont.

Metric #10: Percent of #7 cohort tested for HDL, LDL and Triglycerides by the end of the measurement year.

Metric #11: Percent of #8 cohort with the Cardiovascular Risk Reduction Scorecard completed.

Metric #12: Percent of #8 cohort with the Cardiovascular Risk Reduction related surveys completed.

Metric #13: Bed Days per 1000 enrollees in cohort #4.

Metric #14: Emergency department visits per 1000 enrollees in cohort #4.

Appendix C

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: - % Prime age 46-85 & 18-45 with DX of Hypertension with BP < 140/90

MTF	PER CENT 46-85 YEAR OLDS	PER CENT 18-45 YEAR OLDS	Number 46- 85 with BP <140/90	Number 46- 85 year olds	Number 18- 45 with BP <140/90	Number 18- 45 year olds
MAMC	44.8%	66.7%	1000	2231	2000	3000
NHB	89.8%	50.0%	587	654	500	1000
NHOH	89.3%	60.0%	283	317	300	500
62nd	89.8%	66.7%	194	216	200	300
Region	60.4%	62.5%	2064	3418	3000	4800

Appendix D

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: - % TRICARE PRIME 18-45 & 46-85 year olds using tobacco

MTF	% 18-45 Age Group	% 46-85 Age Group	Number in 18-45 cohort	Number 18-45 Using Tobacco	Number 46-85 in cohort	Number 46-85 Using Tobacco
MAMC	68.3%	78.8%	3000	2050	2231	1757
NHB	58.3%	73.4%	1000	583	654	480
NHOH	58.2%	68.5%	500	291	317	217
62nd	67.0%	80.1%	300	201	216	173
Region	65.1%	76.9%	4800	3125	3418	2627

Appendix E

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: - % TRICARE Prime age >34 discharged with AMI in measurement year and on Beta Blockers within 7 days post discharge

MTF	% Age >34, AMI on Beta Blockers within 7 days post discharge	Number on Beta Blockers within 7 days post discharge	Number age >34 discharged with AMI
MAMC	1.2%	36	3000
NHB	0.9%	9	1000
NHOH	2.6%	13	500
62nd	2.0%	6	300
Region	1.3%	64	4800

Appendix F

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: - % Age 18-75 Discharged with AMI, PTCA, or CABG one year prior to the Measurement Year Screened for LDL-C 60-365 Days Post Discharge

MTF	% 18-75	Number Screened for LDL-C within 60-120 days post discharge	Number 18-75 year olds discharged alive with DX AMI, PTCA, CABG
MAMC	64.4%	1932	3000
NHB	47.2%	472	1000
NHOH	61.4%	307	500
62nd	40.0%	120	300
Region	59.0%	2831	4800

Appendix G

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: - % Age 18-75 Discharged with AMI, PTCA, or CABG one year prior to the Measurement Year with LDL-C test <130 mg/dL 60-365 Days Post Discharge

MTF	PER CENT 18-75; AMI, PTCA, OR CABG; LDL-C <130	Number 18-75; AMI, PTCA, OR CABG; LDL <130mg/dL	Number 18-75; DISCHARGED WITH AMI, PTCA, OR CABG
MAMC	83.3%	2500	3000
NHB	50.0%	500	1000
NHOH	90.0%	450	500
62nd	91.7%	275	300
Region	77.6%	3725	4800

Appendix H

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: % Active Duty Age 18-65 Tested for Cholesterol First 6 Months of Measurement Year Who Were Subsequently Screened for HDL, LDL, Trig by End of Measurement Year

MTF	% Active Duty Screened For HDL, LDL, Trig who had been screened for TC in first 6 Mo of Measurement year	Number Subsequently Screened for HDL, LDL, Trig by End of Measurement Year	Number Active Duty Age 18-65 Tested for Cholesterol in First 6 Mo of Measurement Year
MAMC	66.7%	2000	3000
NHB	75.0%	750	1000
NHOH	98.0%	490	500
62nd	66.7%	200	300
Region	71.7%	3440	4800

Appendix I

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: % of NAD Men (>34 Yr Old) and Women (>44 Yr Old) with Cholesterol >200 mg/dL who were followed up with test for HDL, LDL, & Trig by end of measurement year

MTF	% NAD MEN (>34)	% NAD WOMEN (>44)	Number Males Tested for HDL, LDL, Trig	Number Males with >200 TC age >34	Number Females Tested for HDL, LDL, Trig	Number Females with >200 TC age >34
MAMC	79.9%	73.7%	2398	3000	2211	3000
NHB	49.0%	64.5%	490	1000	645	1000
NHOH	19.8%	61.0%	99	500	305	500
62nd	28.3%	71.0%	85	300	213	300
Region	64.0%	70.3%	3072	4800	3374	4800

Appendix J

TRICARE NORTHWEST OUTCOMES METRICS
CVRR

METRIC: ER Visits/1000 & Bed Days/1000 Enrollees Age 18-75 Discharged with DX AMI, PTCA, or CABG One Year Prior to the Measurement Year

MTF	ER Visits/1000	Bed Days/1000	Total Bed Days for Cohort	Total ER Visits for Cohort	Number Discharged with DX AMI, PTCA, or CABG
MAMC	133.3	33.3	100	400	3000
NHB	150.0	55.0	55	150	1000
NHOH	150.0	50.0	25	75	500
62nd	83.3	50.0	15	25	300
Region	135.4	40.6	195	650	4800

References

American Heart Association (2002). *2002 heart and stroke statistical update*. Retrieved October 26, 2002 from <http://www.americanheart.org/presenter/>

Barton, P. B. (1999). *Understanding the U.S. health services system*. Chicago, IL: Health Administration Press.

Bray, G. A., & Gray, D. S. (1988). *The partnership for healthy weight management*. Retrieved June 9, 2003 from <http://www.consumer.gov/weightloss/bmi.htm>

Castelnuovo, A. D., Rotondo, S., Iacoviello, L., Donati, M. B., & de Gaetano, G. (2002). Meta-analysis of wine and beer consumption in relation to vascular risk. *Circulation*, 105, 2836-2844.

Collins, P., Stevenson, J. C., & Mosca, L. (2002). Spotlight on Gender. *Cardiovascular Research*, 53, 535-537.

Dunn, M. A. (2002). *Caring in Action - Demanding Excellence - Improving Outcomes*. Symposium Conducted at Madigan Army Medical Center, Tacoma, Washington.

Engberg, M., Christensen, B., Karlsmose, B., Lous, J., & Lauritzen, T. (2002). General health screenings to improve cardiovascular risk profiles: A randomized controlled trial in general practice with 5-year

Follow-up. *The Journal of Family Practice*, 51(6), 546-552.

Framingham Heart Study (2002). *The Framingham heart study*. Retrieved October 27, 2002 from www.nhlbi.nih.gov/about/Framingham/design.htm

Haennel, R. G., & Lemire, F. (2002). Physical activity to prevent cardiovascular disease. *Canadian Family Physician*, 48, 65-71.

Kannel, W. B. (2002). The Framingham study: Historical insight on the impact of cardiovascular risk factors in men versus women. *Journal of Gender-Specific Medicine*, 5(2), 27-37.

Klatsky, A. L. (2002). Alcohol and cardiovascular diseases: A historical overview. *Annals of the New York Academy of Sciences*, 957, 7-15.

Lakatta E. G. (2002). Age-associated cardiovascular changes in health: Impact on cardiovascular disease in older persons. *Heart Failure Review*, 7(1), 29-49.

McGinnis, J. M., & Foege, W. H. (1993). Actual causes of death in the United States. *Journal of the American Medical Association*, 270(18), 2207-2212.

MacLean, D. R., Joffres, M. R., Tan, M. H., & Petrasovits A. (2001). Prevalence of cardiovascular risk factors in Canadians with diabetes mellitus. *Advances in*

Experimental Medicine and Biology, 373-380.

National Committee for Quality Assurance. (2002). *HEDIS, 2003, compliance audit: Standards, policies and procedures*.

Washington D.C.: National Committee for Quality Assurance.

Pearson, T. A., Blair, S. N., Daniels, S. R., Eckel, R. H., Fair, J. M., Fortmann, S. P., et al. (2002). AHA guidelines for primary prevention of cardiovascular disease and stroke: 2002 update. *Circulation*, 106, 388-391.

Rooks, R. N., Simonsick, E. M., Miles, T., Newman, A., Kritchevsky, S. B., Schulz, R., et al. (2002). The association of race and socioeconomic status with cardiovascular disease indicators among older adults in the health, aging, and body composition study. *Journal of Gerontology*, 57(4), S 247-256.

TRICARE Management Activity Report. Enrollment. Retrieved October 30, 2002 from <http://www.tricare.osd.mil>

Wilson, P., & Chao, S. (2002). *Random sample size estimator-proportions*. Office for Prevention and Health Services Assessment, U. S. Air Force.

Wilson, P. W., & Kannel, W. B. (2002). Obesity, diabetes, and risk of cardiovascular disease in the elderly. *The American Journal of Geriatric Cardiology*, 11(2), 119-125.